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842-5 Coronary Ultrasound Thrombolysis In Acute Myocardial Infarction: Results From the ACUTE Study

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Background: Clinical data suggest that therapeutic ultrasound selectively ablates thrombi with wide margins of safety. The purpose of the ACUTE study is to evaluate the safety and efficacy of percutaneous coronary ultrasound thrombolysis (CUT) as the primary reperfusion therapy in acute anterior myocardial infarction (AMI) in a multicenter study.

Methods: Patients (pts) with AMI and occluded left anterior descending artery were treated by CUT using a novel percutaneous therapeutic ultrasound device.

Results: CUT was attempted in 31 consecutive pts. Sonication (45 kHz, 18W, ≤3 min) induced arterial patency in 29 (94% of the pts), (TIMI 3 flow in 84%), and residual stenosis of 54 ± 26%. There were no dissections, perforations, embolization, spasm or "no-reflow". There were no adverse clinical events during CUT. Adjunct PTCA resulted in residual stenosis of 17 ± 15%. Stents were deployed in 7 pts (22%). There was no adjunct use of thrombolytic drugs. Reopro was administered in 1 pt (3%). In-hospital, 1 pt (3%) developed reinfarction, and 3 pts (10%) had recurrent ischemia with a need for urgent target vessel revascularization. Six pts (19%) had CHF (NYHC ≥III). There were no deaths, stroke, bleeding or need for vascular repair.

Conclusion: CUT is potentially a safe and effective device-solution for reperfusion therapy in the setting of AMI.

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842-6 Critical Pathway for Acute ST Segment Elevation Myocardial Infarction: Evaluation of the Potential Impact in the TIMI 9 Registry

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Physicians are under increasing pressure to reduce costs and maintain high quality of care. Critical pathways may help accomplish this goal. We designed a critical pathway for acute MI which targets 100% use of appropriate medications (i.e., thrombolysis [or primary angioplasty], aspirin, heparin, beta-blockers, ACE inhibitors) and incorporates a strategy of early hospital discharge (day 4) for low-risk patients. Cardiac catheterization is recommended only for ACC/AHA-recommended indications (recurrent ischemia, low ejection fraction, or other complication). We evaluated the potential impact of this critical pathway using the TIMI 9 Registry database, where 840 consecutive patients with acute ST elevation MI were enrolled at 20 hospitals in the U.S. and Canada. Thrombolysis was used in 503 (60%), primary angioplasty in 77 (9%) and no reperfusion therapy in 31%. Only 87% of pts. received aspirin. Of those with documented LV dysfunction or congestive failure, 39% were treated with ACE inhibitors, indicating that use of a critical pathway targeting 100% use of these medications would improve care. To evaluate the potential economic impact of the critical pathway on low-risk patients, 141 of 503 thrombolysis patients had no recurrent ischemia or MI, shock, CHF through discharge. Their mean length of stay was 8.2 ± 5.4 days, with 88% staying in-hospital >than the target of 4 days. Of these uncomplicated patients, 110 had preserved LV function, yet 64% underwent catheterization and 33% underwent PTCA. For the 77 primary angioplasty patients, 38 had no complications, and their mean length of stay was 7.0 ± 3.0 days, with 90% staying >4 days. If the critical pathway were used for these low-risk patients (assuming costs of $1000/hospital day, $2000/cath, $3500/PTCA), over $500,000 could be saved for every 100 uncomplicated thrombolysis patients, and $350,000 for every 100 uncomplicated PTCA patients.

Conclusions: 1) These findings from the TIMI 9 Registry demonstrate that significant opportunities exist for improving the medical management of patients with acute MI. 2) Critical pathways may help reduce costs while preserving (or improving) quality of care.

843 Aspects of the Congenital Long QT Syndrome

Tuesday, March 31, 1998, 10:30 a.m.–Noon
Georgia World Congress Center, Room 256W

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843-1 Long QT Genotype Can Be Identified by ECG Phenotype

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Background: In a previous study we (Moss, et al) described different ECG T-wave patterns in the LQT1, 2 and 3 genotypes. In this study, we assessed the diagnostic sensitivity/specificity of the Moss patterns and formulated an enhanced criteria set based on new observations.

Methods: Two hundred 12-lead ECGs representing LQT1 (n = 55), LQT2 (79), LQT3 (27), and unaffected (39) genotyped patients (all non-medicated) were read by blinded LQTS researchers. The ECGs were classified as having a LQT1, LQT2, LQT3, unaffected, or an uncertain phenotype using Moss pattern: ST-T morphology, T wave amplitude and duration. The ECG's were also classified using Moss pattern plus new criteria: ST length and slope; distinctiveness of T wave onset/offset, and T wave symmetry. In an expanded set of LQT1 (n = 88), LQT2 (103), and LQT3 (32) records we evaluated age dependent patterns.

Results:

	Sensitivity				Specificity			
Genotype	LQT1	LQT2	LQT3	NL	LQT1	LQT2	LQT3	NL
Moss	0.22	0.30	0.56	0.92	0.97	0.93	0.97	0.78
New Criteria	0.87	0.85	0.70	0.85	0.87	0.94	0.99	0.97

A new phenotype is described in LQT1 patients: short ST segment, asymmetrical peaked T wave, and no clear T onset. (See Example) This new phenotype was expressed by 70% of LQT1 children 0–5 yrs, 6% of older LQT1 children and adults, 0% of LQT2 children, 2% of LQT2 adults, and 0% of all LQT3 patients.

Conclusion: Sensitivity was low in identifying LQT1 and LQT2 using Moss patterns. Sensitivity increased significantly for LQT1 and LQT2 using new phenotypic criteria. In children <6 yrs, using new criteria is essential for LQT1 genotype identification.

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843-2 Wavelet Analysis of Short-term Beat-to-Beat Variability of Repolarization in LQTS Patients With SCN5A Sodium Channel Mutation

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Current techniques evaluating beat-to-beat variability of repolarization rely on accurate determination of T-wave endpoints. This study proposes a method to detect a very short-term repolarization variability in a standard 12-lead ECG using the wavelet transformation (WT) technique.

Methods: Using wavelets from the second gaussian derivative, we filtered the repolarization segment to evaluate variability in 10 LQTS pts with SCN5A mutation (SCN5A+), 13 nonlinked family members (SCN5A−), and 28 unrelated healthy subjects (N). From 10-second ECGs, segments beginning 100 ms after the R peak and ending 220 ms before the following R peak were analyzed. Two parameters quantified beat-to-beat changes of the repolarization segment: the temporal variability in time (TVT) and in amplitude (TVA). Mean value of TVT and TVA from the 12 leads were computed and compared to the mean value of the standard deviation of RT apex duration (SDRTm), a time-domain measure of variability.

Results: Comparison of TVA, TVT, their combination, and SDRTm is shown in the Table (* $p < 0.01$, ** $p < 0.00001$ in reference to group N).

	N (n = 28)	SCN5A− (n = 13)	SCN5A+ (n = 10)
SDRTm (ms)	8 ± 6	14 ± 21	31 ± 41*
SDRTm >21 ms	4%	0%	40%
TVA (°)	12 ± 6	19 ± 9	29 ± 17**
TVT (ms)	4 ± 2	5 ± 3	15 ± 17*
(1) TVA >24°	7%	23%	50%
(2) TVT >2.1 ms	4%	14%	50%
(1) or (2)	11%	30%	90%